

Critical Conversation on the Nitrogen Reduction Challenge

Summary of Discussion



Overview

On May 3-4, 2018, iSEE hosted academics, industry and agricultural leaders, nonprofits, and government and NGO representatives in downtown Chicago's University Club for a conversation on the nitrogen reduction challenge.

This safe space for a frank, unattributed discussion (pictured above) was a positive step toward exploring the issues in reducing runoff from agricultural land into streams, which has caused a major hypoxic zone in the Gulf of Mexico.

Keynote speaker Jason Weller of Land O' Lakes (pictured right) got the conversation started the evening of May 3, and three panel and breakout sessions continued the discussion the next day.

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About This Document

The following sections outline the major talking points of each of the three topical discussion sessions. This is by no means a comprehensive listing of the ideas shared, but is a summary of the points participants spent the most time talking about. Your personal notes from your table discussion may differ in emphasis. Our aim was to supplement your notes with a look into the multitude of viewpoints and opinions about the nature of the problem and its possible solutions that were expressed.

Session 1: Perspectives from the Field: Best Management Practices for N Use and Incentives for Adoption

The first session of the Critical Conversation centered on understanding the drivers of farmers' decisions surrounding nitrogen application and incentives and barriers to adopting modern best management practices. The session began with a panelist discussion between Travis Deppe (Illinois Corn Growers Association), Jerry Flint (DowDupont), Larry Clemens (The Nature Conservancy), and Robb Fraley (Monsanto).

Hyper-precision agriculture, direct engagement with landowners and farmers, and combinations of in-field and edge-of-field strategies dominated the conversation. Implementation of these solutions was the tricky part: would they come about organically because it makes business sense to do so? Or would regulation be necessary to incentivize them?

Major keywords and talking points

Promising best management practices for Nitrogen use and incentives for adoption

- The 4 Rs: Right Source, Right Rate, Right Time, Right Place
- Complement of in-field and edge-of-field practices
 - Bioreactors, wetlands, buffer zones
 - Resource recovery

- Cover crops, N calculator tools, other infield components
- Relationships will matter
 - Precision targeting of decision makers
 - Accountability and trust (between retailers and farmer peers) is important
 - Collaborations between policy makers and farm owners
- Creating a market for N reduction credits (example: water quality credit trading)
- Farmers care about public opinion of agriculture. Could social pressure for environmental stewardship drive change?

Barriers to adoption

- Uncertainties about the promised benefits of in-field and edge-of-field. Lack of measurement data to support the claims.
- Farmers don't change many variables of their operation each growing season, and there's a lot of new things we want them to try
- Cover cropping is essential, BUT upfront costs, chemical issues, and timing are hard to get past
- We can't generalize advice -- every seed is different
- Meter-by-meter management is possible, but only with good data. Data ownership issues arise.
- Have we moved beyond (technologically) what Extension programs can do to help?

What is needed to overcome barriers

- Farmers must be made confident that the solutions promoted are a good investment. Requires proof in the form of data.
- "Bring down the regulatory hammer." Can't get edge of field best management practices adopted without some form of mandate.)
 - Economists play a big role. Need government regulation.
 - BUT, regulation may hurt the menu of solutions considered by a farmers if policy prescribes a solution
- Social impact bonds — could they be created? (cover crops, drainage)
- Shifting focus to overall soil health could solve many problems at once.
- Direct contact with farmers and landowners.
 - Most farmland is rented, making the case to the landowners may be a strategy
 - Additional educational opportunities

Questions/suggestions for later research

- Publications: site-specific benefit of cover crops; value of stacked environmental benefits; technology for cover crops
- Study the longevity of structural practices. What's the upkeep? Do structural practices lose efficacy over time?
- Crops grow so much faster and larger now than they did before. We need new equipment and schedule to keep up.
- What is the monetary value of incentives?
- How does the BMP acknowledge change in farmers' behavior?

- Will reduced N rates in highly productive areas hurt productivity and income over time?
- Is using drones as remote applicators and measurers (better enabling right time and place applications) feasible?
- Effects of climate change.
- N reduction potential in tile drain systems is not well known.

Session 2: Emerging Practices and Technologies to Increase N Use Efficiency

Our second session of the morning put new technology, innovative management practices, and big data and information technologies in the spotlight, and panel discussions and table conversation revolved around the challenges and opportunities these hold for increasing nitrogen use efficiency. Panelists were: Lyndsey Ramsey (Illinois Farm Bureau), Sam Eathington (The Climate Corporation), Sally Flis (The Fertilizer Institute), and Cathy Kling (Iowa State University).

No one in the room seemed to doubt that technologies were available -- if still in the testing phase -- to increase nitrogen use efficiency; access to technology and barriers to adoption were the sticking points. Looming over the conversation were always the “dirty” words Tax and Regulation. Can the necessary nitrogen reduction be made profitable? Or will good will and profitability need to be supplemented with regulation?

Major keywords and talking points

Promising technologies to create lasting positive change in N efficiency

- “New precision”
 - Move from fall application to spring
 - Spatially distributed N/water sensors and remote sensing technologies
 - In-season application - drones may let you access the middle of a field when the crop is tall without hurting it
 - Seed tech is changing application needs
- Nitrification inhibitors (mentioned by Sally Flis) — do we have the data to show effectiveness?
- Soil microbes/biologicals
- Gene editing
- Slow-release granular fertilizer
- Cover crops, soil health Tech that WORKS: saturated suffers, wetlands, edge-of-field. But they are big, pricey projects.
- Large scale restored wetlands and floodplain restoration
- Organic matter will play a role; N loss might have nothing to do with N application.
- Technology isn’t useful unless there is investment in training people to use it, be confident in it.

Barriers to adoption or effectiveness of technologies

- Regulation: policy limits what agribusiness companies and chemical companies can develop
- “Performance but no pay”
- A lot of data being collected but not being shared or analyzed together.
- Proprietary technology doesn’t share models (which is their right), but it harms trust.
- Labor crisis: do we have the manpower to operate new equipment, apply new products, make small but frequent N applications?

What is needed to overcome barriers

- Tax credit for trying out a technology
- Real-time testing of soil is unfeasible now, so let’s innovate.
- We need everything in terms of dollars to make a business case.

Questions/suggestions for later research

- Lots of questions on data:
 - Re-evaluate companies’ privacy policies protecting farmers’ data?
 - Is data available on a broad scale? Is data reliable? How do we mobilize data?
 - Are we expecting too much from tech and data? Why invest in a new tech now when it will improve over the next year?
- Is it possible that optimal adoption just won’t do enough?
- Is a tax really efficient?
 - Loss reduction and efficiency are different things
 - Getting these permits, paying taxes, etc...you’re basically paying to pollute. It doesn’t change the inputs. You’re just paying more.
- Microbial products to stabilize N
- Gene editing to make more efficient root growth
- Unintended consequences of emerging technologies

Session 3: Effective Demand-Driven and Market-Based Policy Options to Reduce N Runoff

The last conversation session explored the role for market demand and policy incentives to influence adoption of best management practices. Panelists Otto Doering (Purdue University), and Julie Armstrong (Illinois Nutrient Research & Education Council) answered questions in the room, and Suzy Friedman (Environmental Defense Fund) and Allison Thomson (Field to Market) joined via speakerphone.

Major keywords and talking points

Promising demand-driven and policy-based options

- Create tradable pollution quotas, auction them off, use revenues for environmental purposes.

- It's all about greater collaboration:
 - Develop synergies with connected industries
 - Public-private partnerships
 - Address the landowner-farmer gap. (tenants, cash rent)
 - Connection of water utilities to agriculture to find a common economic outcome (what is cost of N removal from treatment?)
- Precision incentives:
 - Measure and quantify the value of the outcome. Incentivize for solutions that drive biggest outcome.
 - Incentive dollars matched to expected relative benefit
- Do not regulate approaches, regulate outcomes and enable farmers to respond to meet the regulated goals.
- We need more technical assistance, not regulators.
- Federal-level policy to overcome support state goals.

Barriers to adoption or effectiveness of policy

- Variability in weather undermines efforts to regulate outcomes alone
- Farmers can't afford \$30 cover crops if not scalable

What is needed to overcome barriers

- Science must provide a clear line from cause to effect for relevant nitrogen interventions.
- Maybe we need to just try something! Try it and see if it fails. If it does, try something else.
- We might need somebody to show they can do it before letting farmers adopt it.

Questions/suggestions for later research

- We've talked about precision application, could there also be precision taxation? Site-specific.
- Interaction of practices, science today characterize "what" but we want to know more "why"
- Could consumers pay a premium for best management practices in ingredients? They already pay for the environmental implication of "organic"...
- How do we get more "boots on the ground" with NRCS?
- More info about the right time to fertilize and right amount
- Can food manufacturers, brands pay growers to be more N efficient?
- Is 45% goal still attainable, even doing everything right?
- Corn is the nitrogen bad guy. If corn was less desirable crop because less demand from ethanol, would the N problem solve itself?

Conclusion

The Critical Conversation wrapped up with a sticky-note session dedicated to giving the organizers feedback on how it can productively engage to help improve nitrogen use efficiency, and ultimately solving the hypoxia problem in the gulf. Participants gave a lot of helpful feedback, and we'll be using it to guide our ideas and actions going forward.